

ABSTRACT

An electromagnetic borehole telemetry system providing improved signal to noise ratio. Adaptive filters use noise channels as references to remove noise from the signal channel. Directional detectors provide a signal channel with reduced noise content and improved noise channels with reduced signal content. Directional detectors may be magnetometers aligned with the magnetic field, or antennas aligned with the electric field, of signal or noise sources. Alignment may be performed by beam steering of the outputs of a three-channel detector, which may detect both signal and noise.